

It should be noted, in conclusion, with reference to this method of treatment, that the general condition of the patients improves under treatment to a remarkable extent. No patient was kept in bed the whole day, considerable rest was advised, but absolute rest was only insisted upon for two hours before taking pills.

[The notes were here given of the 30 cases on which the above conclusions are based.]

Flagellate Dysentery.

The results of the treatment of dysentery caused by *Tetramitus mesnili* and *Lambliia intestinalis* are extremely disappointing. In our experience these parasites have been exceedingly common, although in a large proportion of cases they produce no symptoms. It is no doubt owing to this fact that flagellate dysentery has been regarded, and is still regarded in some quarters, as a disease of no moment. It is, however, beyond question that these parasites are capable of producing very severe symptoms and of causing much chronic ill-health. The number of drugs which have been recommended for these infections is a sure indication of their therapeutic worthlessness. A full literature will be found in the excellent work of Fantham, Stephens, and Theobald.⁴

Tetramitus dysentery.—The following is a record of the treatment of a case of tetramitus infection.

Patient, aged 33, admitted to hospital on April 17th, 1917. History of two or three slight attacks of dysentery (*sic*) in 1916. Diarrhoea with tenesmus and passage of blood and mucus began on April 13th. Blood and mucus present on admission and frequently observed afterwards. Tetramitus cysts found in stools. No other parasite and no dysentery bacilli were ever present. Saline treatment by mouth was adopted at outset and daily colon lavage with normal saline tried from May 8th to 25th. Creosote was tried, but so upset the digestion that it had to be stopped. B-naphthol begun on June 6th in 5 gr. doses thrice daily, but without effect. On June 29th one grain of emetine was given hypodermically and continued for five days, after which three grains of bismuth emetine iodide were given daily for six days. This was also without avail, and we have frequently observed the failure of this treatment in tetramitus cases.

On July 13th thymol, as recommended by Smithies,⁵ was given in an anthelmintic dose along with two grains of calomel. After this free tetramitus were abundant. On July 17th a course of silver nitrate ($\frac{1}{4}$ gr. thrice daily) was commenced and continued for a fortnight, and finally, following Escomel,⁶ we gave an anthelmintic dose of oil of turpentine. At the close of this varied treatment tetramitus, both free and encysted, were as numerous as ever.

Another case was treated by a long course of creosote, ending up with 2 c.cm. of oil of turpentine, with an equally unsatisfactory result.

Lambliia dysentery.—It is rare to find acute symptoms produced by lamblia infection, but chronic diarrhoea is in our experience very common. As the parasite inhabits the small intestine and has a firm hold of the mucous membrane with its suckorial discs, it is not surprising that treatment is difficult and results disappointing. Male fern has been recommended (Prowazek and Werner⁷); we gave it a trial in one case in the dose of one drachm, but without any effect. The pathogenicity of lamblia is often doubted, but Captain Scott Pinchin very kindly placed at our disposal the notes of a case of extremely acute lamblia infection.

Patient retired to bed one night in perfect health and was awakened at 6 o'clock the following morning by profuse watery evacuations, tenesmus, and violent cramps. The symptoms and stools closely resembled those of cholera, but the stools revealed nothing but the presence of lamblia in myriads. At 10 A.M. patient's condition was serious in the extreme. He was literally dried up on account of the violent diarrhoea, the skin was cold, and cyanosis was commencing. The timely infusion of two pints of hypertonic saline was carried out, and was followed by prompt and complete recovery.

We desire to express our indebtedness to Lieutenant-Colonel G. B. Price, the Commanding Officer of the Military Hospital, Intarfa, for permission to publish this paper and for the facilities he has afforded us in our work.

References.—1. Waddell, W., Banks, C., Watson, H., and Redman King, W. O.: The Treatment of 102 Carriers of Amoebic Dysentery with Emetine Bismuth Iodide, THE LANCET, 1917, ii., 73. 2. Waddell, &c., loc. cit. 3. Lillie, D. G., and Shephard, S.: The Treatment of *E. histolytica* Carriers with Emetine Bismuth Iodide, THE LANCET, 1917, ii., 418. 4. Fantham, H. B., Stephens, J. W. W., and Theobald, F. V.: The Animal Parasites of Man, London, 1916, pp. 624 and 625. 5. Smithies, quoted by Fantham, loc. cit. 6. Escomel, quoted by Fantham, loc. cit. 7. Prowazek and Werner, quoted by Fantham, loc. cit.

THE Taunton and Somerset Hospital has raised £3800 of the £4000 required to defray the existing debt.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.—At a meeting of the President and Fellows of the Royal College of Physicians of Ireland held on March 1st Dr. J. F. O'Carroll, the President, in the chair, Dr. George Sigerson was elected an Honorary Fellow of the College.

KNEE-JOINT WOUNDS AT A CASUALTY CLEARING STATION.

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THE following notes are on 73 consecutive cases of knee-joint wounds treated at a casualty clearing station in France.

An attempt has been made in this series of cases to remove foreign bodies and loose bone from the joint, to wash out dirt or blood clot, and to close the joint capsule and external wound. This done, a splint has been applied (usually a Thomas or a modified Thomas), and the knee left without change of dressings for three to seven days.

In times of rush it was impossible to keep the patients more than a day or two, but in quieter times we kept them much longer. The average time in the casualty clearing station for this series is 5.2 days. The degree of primary success has been very much greater than was expected, and so far as the reports from the base in France go the same can be said. Unfortunately, the reports from the home hospitals are very few, although we have waited six months since the last case left the C.C.S.

There have been three deaths reported in the series of 73; two at the C.C.S. and one in England. Four cases have required amputation here, one for infection by *Streptococcus longus* (died as above), and three for gas gangrene developing in the limb, one of whom died. We have only one record of an amputation being done at the base or in England, and certainly no case left the C.C.S. where such a result was anticipated, and most of the cases had a fair chance of getting a useful joint.

(A) All cases. (B) Penetration of knee-joint, not accompanied by fracture. (C) Accompanied by fracture.

	(A)	(B)	(C)
Total No.	73	49	24
Evacuated to base {	Leg sound	67	46
	After amputation	2	1
	After excision of patella	2	—
Died after amputation... ..	2	2	—

The bones involved in (C) were: Femur—complete, 3; partial, 6 (1 amputation); tibia, 2; patella tibia, and fibula, 2; patella and femur, 3; patella, 4 (2 excisions); fibula, 1.

The following are the methods of treatment and account of reports:—

Method of treatment.—Opened, irrigated, and closed, 49; capsule not closed, 14; capsule not opened, 13.

Antiseptic used.—Eusol, 39; soap, 20; none, 6; ether, 3; B.I.P.P., 3; hydrogen peroxide, 1; saline, 1.

Casualty Clearing Station.—4 amputations; 2 excisions of patella. Others all doing well and expected to retain limb, and many expected to have useful joints.

Base.—50 reports received. No deaths. 1 amputation for gas gangrene, calf. 1 joint opened and drained.

United Kingdom.—16 Reports.

1 "discharged to duty."	2 "doing well."
1 "nearly complete range of movement."	1 reports arrival.
1 "not ankylosed."	2 "ankylosed."
1 "impaired movement; improving."	1 "in plaster and crutches."
1 "patella moves, and to begin movement soon. Excellent condition."	4 discharged unfit for service; (a) 3 stiff joints, (b) 1 much stiffness.
	1 death—septicæmia.

Notes of Cases.

1. Revolver bullet. Entrance wound cleaned up and excised. Bullet removed from interior of joint at lower level of patella. Wounds closed. Thomas's splint. Eusol. In C.C.S. 11 days. Base: Doing well. Evacuated to England. England: Discharged to dépôt. Fit for service.

2. Shell. Patella excised. Joint irrigated and closed. C.F. (Compound fracture of patella.) Eusol. In C.C.S. 4 days. Base: Diagnosis confirmed. Wound examined and dressed with eusol. England: Ankylosis. Quite useful limb.

3. Shell. Penetrating wound left knee-joint. Piece of metal removed from outer side of joint. Synovial cavity closed. Eusol. In C.C.S. 1 day. Track seemed fairly clean. Base: 21 days later to England. Knee: saline dressings. Clean. Healed. England: Nil.

4. Shell. Small entrance wound below and to outer side of margin of patella. Track followed down to external condyle. Joint full of blood. On full flexion piece of damaged cartilage found, on removing which piece of metal discovered. Bone chiselled away round this. Metal removed. Joint irrigated with soap solution. Wound closed. Page's splint. In C.C.S. 7 days. Base: T. 99°. P. 90. Slight extension applied. Sutures removed. Iodine dressing. Four days later T. and P. normal. Two days later T. 99.2°, P. 88. Much improved. Wound quite clean. England: Nil.

5. Shell. Track opened up. F.B. exposed and chiselled out of bone. Joint sutured. Page's splint. Soap solution. In C.C.S. 7 days. Base: No signs of infection. Little swelling. No other sign of significance. Wound healing without constitutional symptoms. England: Nil.

6. Shell. Joint opened. Loose bone scraped out, together with cloth. Large piece of metal removed by incisions above and to inner side of patella. Page's splint. C.F. Internal condyle femur fractured. Closed. Soap dressing. In C.C.S. 7 days. Base: Patient developed septic

arthritis. Drainage of joint and aspiration; large amount of pus evacuated from joint recesses. Slow improvement. Evacuation to England in good general condition 30 days after injury. Some osteomyelitis of femur remains and low joint infection. U.K.: Knee stiff, but not ankylosed.

7. Shell. Wound opened up and piece of shrapnel removed, seven-eighths out and one-eighth in joint. Page's splint. Closed. Soap solution. In C.C.S. 11 days. Base: 10 days after C.C.S. a little fluid left knee and a little swelling. Kept on same splint. T. and P. normal. England: Nil.

8. Shell. Capsule cut down upon and cloth removed; also metal $\frac{1}{2}$ in. by $\frac{1}{4}$ in. between crucial ligaments. Closed. Soap solution. In C.C.S. 6 days. Base: Joint quietening down. England: In plaster. Going about on crutches.

I have to thank Captain H. T. Bates and Captain P. McEwan for notes on their cases, which are included.

THE OPERATIVE CORRECTION OF DEFORMITY IN GUNSHOT FRACTURES.

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MUCH has been learnt regarding the treatment of all fractures since the beginning of the war. Recently arrangements have been made for the complete treatment of a large number of fractures of the femur in hospitals in France, and excellent results are being obtained by the many extension apparatuses—Thomas's splint, Sinclair's net frame, &c. But one constantly sees soundly healed fractures in which these methods have failed to obtain a satisfactory result. These must be treated by open operation, and this is not to be undertaken without grave consideration.

In the Cambridge Hospital, Aldershot, we have two distinct groups of cases—simple fractures among men undergoing military training and gunshot fractures from the Forces overseas.

Simple Fractures.

In the simple fractures in most cases the patient is first put on some form of extension, and, if good alignment is not obtained after a short interval, operation is proceeded with. We find there are two types of recent fracture in which operation is nearly always required—namely, spiral fractures in any part of the shaft and any fracture near a joint. The question may here be raised as to when an operation should be decided on in cases where a preliminary trial of extension methods has been employed. If operation is delayed beyond a month there is much trouble in removing the callus and exposing the original fracture line. The ends have got somewhat rounded off so that they do not fit neatly together. Most important of all, the bone has become rarefied; and although where one is working with two long fragments this has little or no effect on the strength of the primary junction made by the plate and screws, it is of great importance when one is dealing with a short fragment in the neighbourhood of a joint. One of our cases bears out this point. A trial of extension methods need not be prolonged beyond a fortnight, for if by then correct position and alignment have not been obtained it is extremely unlikely that any improvement will afterwards supervene.

In all our operations Lane's technique is carefully followed.

Towels are clipped along the edges of the incision so that no portion of skin is exposed. The knife used for the primary incision is discarded and for the deeper dissection a second is employed. Every manipulation is carried out with instruments, and nothing which has even touched the gloved hand of the operator or his assistant is allowed to come into contact with the wound.

In all cases no foreign material but the plate is left in the wound. The only exception to this rule is that occasionally a larger vessel is not controlled by forcipressure, and then a catgut ligature is applied, the knot being tied with instruments. Mopping is done with gauze on long forceps.

The skin edges are brought together with Michel's clips, so preventing anything that has passed through the skin entering the wound.

Where this ritual can be observed carefully in all its details the surgeon may operate on any simple fracture with the utmost confidence.

Gunshot Fractures.

We do not propose to discuss the treatment during the septic discharging period, but to pass on to those cases apparently soundly healed, but where malunion very much impairs the usefulness of the limb. The deformity can only be corrected by an open operation. The question of lighting

up a latent infection has always to be considered, and opinion varies much as to the time which should be allowed to elapse between the healing of the wound and operation. As this is the point around which turns the success of the operative treatment of gunshot fractures we will now state how we have been guided to a decision.

As soon as one of these cases came under our charge we first turned our attention to the improvement of the nutrition of the limb, for if the deformity is merely reduced the patient would be left little better off than before, because the muscles would be atrophied and fibrosed and the joints stiff. Massage, hot-air baths, and electrical treatment were started, and in this way scars were relieved, induration and oedema cleared up, and the mobility of joints improved. In the course of this preparation a number of wounds became inflamed, and in some cases began to discharge again. From this observation we got the idea that a careful trial with massage, electrical treatment, and exercises would be the safest guide as to the quiescence or not of the infection, and we started the practice of submitting the limb to manipulations of increasing severity and carefully observing the result.

For the first few days light massage is employed, and this seldom gives rise to any disturbance, but if it does it is obvious that the organisms are still in an active state and that operation is a long way off. In those cases where this preliminary massage produces no reaction the masseur is instructed to manipulate the deeper structures—the structures around the fractured ends. This frequently causes pain lasting for some hours, development of local swelling and tenderness, accompanied by local rise of temperature, all indications that the organisms lying in the deeper recesses of the wound are still too active. Further, if no trouble arises after the above measures the patient, in addition, passes on to graduated exercises involving active movement of the neighbouring joints, and in cases where no serious discomfort ensues one can reasonably consider the question of operation.

The following cases illustrate these points:—

1. Private T. Gunshot wound of shoulder; fracture involved head of humerus and clavicle; head of bone had been excised. Five months afterwards wounds almost healed; massage begun. Efficacy caused general reaction necessitating free incisions and removal of several small sequestra.

2. Private B. G.S.W. of radius. Massage started three months after he was wounded; wounds had been closed for three weeks. At end of six days' treatment limb became red and swollen; sinus opened; fortnight later sequestrum removed.

3. Captain M. G.S.W. of humerus with lesion of musculo-spiral nerve. Sinus had discharged at intervals; several small sequestra had separated and been removed. When massage was commenced wound had been completely healed for two months, but when stage of heavy massage was reached wound broke down again, sinus reopened, and piece of catgut was discharged.

The next case shows how dangerous it is to carry out what seem to be comparatively safe measures without having previously tested the quiescence of the infection.

4. Private R. G.S.W. of femur; fracture in middle of thigh. Eleven months after being wounded there was still a sinus discharging on outer aspect of limb. X ray showed sequestrum. An incision was made and this dead bone removed. As temperature had been quite normal for some months, it was thought perfectly safe forcibly to move knee-joint through a few degrees. This was carried out; a few adhesions were broken down and knee-joint flexed through rather less than 10°. A septic arthritis developed, which ultimately resulted in amputation through thigh. The various stages of massage should have been carried out before forcible movement was adopted.

With regard to the actual operation in gunshot fractures the important point is that no bone should be cut away. The patient benefits little if the limb is simply straightened without being lengthened. We consider that the restoration of the bone to its full length is so important that, at the risk of being wearisome, we would discuss briefly the best means of assuring full correction both in transverse and oblique or spiral fractures.

The malunited fracture is fully exposed through a long incision. The bone is divided at line of union and the ends carefully freed. All new formation is removed as far as possible to re-establish as closely as can be done the condition immediately after the fracture.

In the transverse variety the two ends are now caught with the bone-holding forceps and drawn well out of the wound, the limb being acutely bent at fracture line. The ends are now easily brought together and are clamped and held together with another bone-holding forceps while an assistant forces the limb out straight.

In the spiral fracture the method is somewhat different. If the above method is tried the two oblique ends always glide past one another whenever the assistant tries to straighten the limb. The two fragments really form two inclined planes that can be made to glide on one another. After freeing, as above described, the two planes are laid together. The pull of the muscles brings the base of one plane almost opposite the base of the other. The jaws of a strong bone-holding forceps grasp and crush the two planes together. Sometimes this simple pressure will make them glide so that the point of one fragment lies opposite the base of the other, thus producing complete correction of the deformity. Usually it is necessary to insinuate an elevator between the planes or the end of the screwdriver, and rolling this at the same time as pressure is made with the holding forceps the two surfaces glide into accurate apposition.